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10/681,493	10/07/2003	Tommy Skiba	C-3024	5903

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EXAMINER	
PARSONS, THOMAS H	
ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 12/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/681,493	SKIBA ET AL.	
	Examiner	Art Unit	
	Thomas H. Parsons	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the instant specification exceeds 150 words. Accordingly, the Examiner suggests amending the abstract, as appropriate, to be within the range of 50 to 150 words.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-11, 15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiser et al. (6,887,599) in view of Donohue et al. (6,399,231).

Claim 1: Reiser et al. in Figure 1 disclose a fuel cell power plant (100), comprising:

a plurality of fuel cells serially connected in a stack (col. 5: 4-19) having a pair of external circuit output terminals (177, 178);

a voltage limiting auxiliary load (148), disposed to dissipate heat in an element (cathode flow field plate 120) of the fuel cell power plant so as to raise the temperature of the element.

a switch (156) connected in series with the auxiliary load (148) between the terminals. See col. 4: 45-col. 8: 19.

Reiser et al. do not disclose a switch control means.

Donohue et al. in Figures 3 and 4 disclose a switch (138) connected in series with an auxiliary load between fuel cell terminals and a switch control means (col. 5: 20-23).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell of Reiser et al. by incorporating the switch control means of Donohue et al. because Donohue et al. disclose a switch control means that would have provided a means for recovering all the performances losses that occur during periods of normal operation by operating the cell at a low cathode performance potential thereby maintaining performance level of the cell at a high level for an extended period of time.

The Reiser et al. combination does not discloses a switch control means *operable during fuel cell stack operation transitions selected from startup and shutdown for causing said switch to alternatively (a) connect said auxiliary load between said terminals, (b) disconnect said auxiliary load from at least one of said terminals, repetitively during at least one of said transitions, in response to electrical output of said fuel cell stack, and operable during periods of time exclusive of start up and shutdown in response to temperature resulting from heat dissipated by said auxiliary load in said element.*

However, Donohue et al. disclose on col. 5: 20-24 that the system 92 (which obviously would be applicable to systems 93 and 94 as shown in Figures 3 and 4) includes controls for operating valves and switches either upon demand, in accordance with a schedule, or when certain measured parameters reach preselected values.

Therefore, it would have been within the skill of one having ordinary skill in the art of control systems at the time the invention was made to have modified the switch control means of Donohue et al. to be *operable during fuel cell stack operation transitions selected from startup and shutdown for causing said switch to alternatively (a) connect said auxiliary load between said terminals, (b) disconnect said auxiliary load from at least one of said terminals, repetitively during at least one of said transitions, in response to electrical output of said fuel cell stack, and operable during periods of time exclusive of start up and shutdown in response to temperature resulting from heat dissipated by said auxiliary load in said element.*

Claim 2: Reiser et al. in Figure 1 disclose a fuel cell power plant (100), comprising:

a plurality of fuel cells serially connected in a stack (col. 5: 4-19 having a pair of external circuit output terminals (177, 178);

a voltage limiting auxiliary load (148);

a switch (156) connected in series with the auxiliary load (148) between the terminals.

Reiser et al. do not disclose a switch control means.

Donohue et al. in Figures 3 and 4 disclose a switch (138) connected in series with an auxiliary load between fuel cell terminals and a switch control means (col. 5: 20-23).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell of Reiser et al. by incorporating the switch

control means of Donohue et al. because Donohue et al. disclose a switch control means that would have provided a means for recovering all the performances losses that occur during periods of normal operation by operating the cell at a low cathode performance potential thereby maintaining performance level of the cell at a high level for an extended period of time.

The Reiser et al. combination does not discloses a switch control means *operable during fuel cell stack operation transitions selected from startup and shutdown for causing the switch to alternatively (a) connect the auxiliary load between the terminals and (b) disconnect said auxiliary load from at least one of said terminals, repetitively during at least one of said transitions.*

However, Donohue et al. disclose on col. 5: 20-24 that the system 92 (which obviously would be applicable to systems 93 and 94 as shown in Figures 3 and 4) includes controls for operating valves and switches either upon demand, in accordance with a schedule, or when certain measured parameters reach preselected values.

Therefore, it would have been within the skill of one having ordinary skill in the art of control systems at the time the invention was made to have modified the switch control means of Donohue et al. to be *operable during fuel cell stack operation transitions selected from startup and shutdown for causing the switch to alternatively (a) connect the auxiliary load between the terminals and (b) disconnect said auxiliary load from at least one of said terminals, repetitively during at least one of said transitions.*

Claim 3: The Reiser et al. combination discloses a switch control means but does not disclose a switch control means *operable in response to electrical output of the fuel cell stack.*

However, Donohue et al. disclose on col. 5: 20-24 that the system 92 (which obviously would be applicable to systems 93 and 94 as shown in Figures 3 and 4) includes controls for operating valves and switches either upon demand, in accordance with a schedule, or when certain measured parameters reach preselected values.

Therefore, it would have been within the skill of one having ordinary skill in the art of control systems at the time the invention was made to have modified the switch control means of Donohue et al. to be operable in response to an electrical output of the fuel cell stack wherein an electrical output of the fuel cell stack has been construed as a measured parameter.

Claim 4: The Reiser et al. combination discloses a switch control means but does not disclose a switch control means comprises pulse width modulation responsive to a function of the voltage across the terminals.

However, Donohue et al. disclose on col. 5: 20-24 that the system 92 (which obviously would be applicable to systems 93 and 94 as shown in Figures 3 and 4) includes controls for operating valves and switches either upon demand, in accordance with a schedule, or when certain measured parameters reach preselected values.

Therefore, it would have been within the skill of one having ordinary skill in the art of control systems at the time the invention was made to have modified the switch control means of Donohue et al. to comprise pulse width modulation responsive to a function of the voltage across terminals wherein pulse width modulation responsive to a function of the voltage across has been construed as certain measured parameters that reach preselected value.

Claim 5. The Reiser et al. combination discloses a switch control means but does not disclose a function that is at least one schedule of desired duty cycle as function of the voltage across said terminal.

However, Donohue et al. disclose on col. 5: 20-24 that the system 92 (which obviously would be applicable to systems 93 and 94 as shown in Figures 3 and 4) includes controls for operating valves and switches either upon demand, in accordance with a schedule, or when certain measured parameters reach preselected values.

Therefore, it would have been within the skill of one having ordinary skill in the art of control systems at the time the invention was made to have modified the switch control means of Donohue et al. to comprise is at least one schedule of desired duty cycle as function of the voltage across said terminal.

Claim 6: The Reiser et al. combination discloses a switch control means but does not disclose a first schedule during startup and a second schedule, different from said first schedule, during shutdown.

However, Donohue et al. disclose on col. 5: 20-24 that the system 92 (which obviously would be applicable to systems 93 and 94 as shown in Figures 3 and 4) includes controls for operating valves and switches either upon demand, in accordance with a schedule, or when certain measured parameters reach preselected values.

Therefore, it would have been within the skill of one having ordinary skill in the art of control systems at the time the invention was made to have modified the switch control means of Donohue et al. to comprise a first schedule during startup and a second schedule, different from the first schedule, during shutdown.

Claim 7: The Reiser et al. combination discloses a switch control means but does not disclose a switch control means that limits the duty cycle in response to a function of power dissipated in the auxiliary load.

However, Donohue et al. disclose on col. 5: 20-24 that the system 92 (which obviously would be applicable to systems 93 and 94 as shown in Figures 3 and 4) includes controls for operating valves and switches either upon demand, in accordance with a schedule, or when certain measured parameters reach preselected values.

Therefore, it would have been within the skill of one having ordinary skill in the art of control systems at the time the invention was made to have modified the switch control means of Donohue et al. to limits the duty cycle in response to a function of power dissipated in the auxiliary load.

Claim 8: The Reiser et al. combination discloses a switch control means but does not disclose a switch control means that limits the amount of time that the switch connects the auxiliary load between the terminals in response to a function of power dissipated in the auxiliary load.

However, Donohue et al. disclose on col. 5: 20-24 that the system 92 (which obviously would be applicable to systems 93 and 94 as shown in Figures 3 and 4) includes controls for operating valves and switches either upon demand, in accordance with a schedule, or when certain measured parameters reach preselected values.

Therefore, it would have been within the skill of one having ordinary skill in the art of control systems at the time the invention was made to have modified the switch control means of

Donohue et al. to limits the amount of time that the switch connects the auxiliary load between the terminals in response to a function of power dissipated in the auxiliary load.

Claim 9: The Reiser et al. combination discloses a switch control means but does not disclose a switch control means that causes the switch to connect the auxiliary load between the terminals in response to the voltage across said terminals reaching 0.4 volts per cell; and that causes the switch to disconnect the auxiliary from at least one of the terminals in response to the voltage across the terminals reaching 0.0 volts per cell.

However, Donohue et al. disclose on col. 5: 20-24 that the system 92 (which obviously would be applicable to systems 93 and 94 as shown in Figures 3 and 4) includes controls for operating valves and switches either upon demand, in accordance with a schedule, or when certain measured parameters reach preselected values.

Therefore, it would have been within the skill of one having ordinary skill in the art of control systems at the time the invention was made to have modified the switch control means of Donohue et al. to cause the switch to connect the auxiliary load between the terminals in response to the voltage across the terminals reaching 0.4 volts per cell; and to cause the switch to disconnect the auxiliary from at least one of the terminals in response to the voltage across the terminals reaching 0.0 volts per cell.

Claim 10: The Reiser et al. combination discloses a switch control means but does not disclose a switch control means that causes the switch to connect the auxiliary load between the terminals in response to the voltage across the terminals reaching 0.2 volts per cell; and that causes the switch to disconnect the auxiliary from at least one of the terminals in response to the voltage across the terminals reaching 0.1 volts per cell.

However, Donohue et al. disclose on col. 5: 20-24 that the system 92 (which obviously would be applicable to systems 93 and 94 as shown in Figures 3 and 4) includes controls for operating valves and switches either upon demand, in accordance with a schedule, or when certain measured parameters reach preselected values.

Therefore, it would have been within the skill of one having ordinary skill in the art of control systems at the time the invention was made to have modified the switch control means of Donohue et al. to cause the switch to connect the auxiliary load between the terminals in response to the voltage across the terminals reaching 0.2 volts per cell (which has been construed as certain measured parameters at preselected values); and to cause the switch to disconnect the auxiliary from at least one of the terminals in response to the voltage across the terminals reaching 0.1 volts per cell (which has been construed as certain measured parameters at preselected values).

Claim 11: The Reiser et al. combination discloses a switch control means but does not disclose a switch control means that limits the amount of time that the switch connects the auxiliary load between the terminals in response to the signal indicating a temperature in excess of a threshold temperature, or a temperature means for providing a signal indicative of the temperature of the auxiliary load.

However, Donohue et al. disclose on col. 5: 20-24 that the system 92 (which obviously would be applicable to systems 93 and 94 as shown in Figures 3 and 4) includes controls for operating valves and switches either upon demand, in accordance with a schedule, or when certain measured parameters reach preselected values.

Therefore, it would have been within the skill of one having ordinary skill in the art of control systems at the time the invention was made to have modified switch control means of Donohue et al. with a temperature means for providing a signal indicative of the temperature of the auxiliary load (i.e. a means for measuring a certain measured parameters at a preselected value), and to limits the amount of time that the switch connects the auxiliary load between the terminals in response to the signal indicating a temperature in excess of a threshold temperature.

Claim 15: Reiser et al. in Figure 1 discloses a fuel cell power plant (100), comprising:

a plurality of fuel cells serially connected in a stack (col. 5: 4-19) having a pair of external circuit output terminals (177, 178);

a voltage limiting auxiliary load (148), disposed to dissipate heat an element (120) of the fuel cell power plant so as to raise the temperature of said stack;

a switch (156) connected in series with the auxiliary load (148) between the terminals.

Reiser et al. do not disclose a switch control means.

Donohue et al. in Figures 3 and 4 disclose a switch (138) connected in series with an auxiliary load between fuel cell terminals and a switch control means (col. 5: 20-23).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell of Reiser et al. by incorporating the switch control means of Donohue et al. because Donohue et al. disclose a switch control means that would have provided a means for recovering all the performances losses that occur during periods of normal operation by operating the cell at a low cathode performance potential thereby maintaining performance level of the cell at a high level for an extended period of time.

The Reiser et al. combination does not discloses a switch control means *operable to control the switch (a) during transitions selected from startup and shut down in response to electrical output of the fuel cell stack and (b) during periods of time exclusive of start up and shut down in response to temperature resulting from heat dissipated by the auxiliary load in the element.*

However, Donohue et al. disclose on col. 5: 20-24 that the system 92 (which obviously would be applicable to systems 93 and 94 as shown in Figures 3 and 4) includes controls for operating valves and switches either upon demand, in accordance with a schedule, or when certain measured parameters reach preselected values.

Therefore, it would have been within the skill of one having ordinary skill in the art of control systems at the time the invention was made to have modified the switch control means of Donohue et al. to be *operable to control the switch (a) during transitions selected from startup and shut down in response to electrical output of the fuel cell stack and (b) during periods of time exclusive of start up and shut down in response to temperature resulting from heat dissipated by the auxiliary load in the element.*

Claim 17: Reiser et al. in Figure 1 show that the element (120) conducts oxidant toward the fuel cell stack.

4. Claims 9-10, 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiser et al. in view of Donohue et al. as applied to claim 2 above, and further in view of Applicants' Specification.

Reiser et al. are as applied, argued, and disclosed above, and further in view of Applicants' specification.

Claims 9 and 13: The Reiser et al. combination discloses a switch control means but does not disclose a switch control means that causes the switch to connect the auxiliary load between the terminals in response to the voltage across the terminals reaching 0.2 volts per cell; and that causes the switch to disconnect the auxiliary from at least one of the terminals in response to the voltage across the terminals reaching 0.1 volts per cell.

The Applicants on page 11, lines 7-22 "The operation illustrated in Fig. 3 can also be performed by commercially available voltage responsive hysteresis switches provided by Eurotherm Action, Inc. (on the net at www.eurotherm.com and www.actionio.com), Model Nos. AP1080 and AP1090. These models are responsive to the upper or lower voltage level after 100 milliseconds to either open or close the corresponding switch; however, they are readily modified to be responsive to voltage levels after only 25 milliseconds. Because the voltage levels appropriate for switching the auxiliary load in and out of the circuit may be different during startup from the appropriate voltage levels during shutdown, the upper and lower limits of Fig. 4 may be selected for shutdown in the one case and for startup in the other case. if the commercial switches, such as the API 080 or API 090, are utilized, separate switches may be enabled, each having an appropriate set of voltage limits, one being enabled during startup and the other being enabled during shutdown.

Therefore, in light of the teaching of known switches, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have selected the appropriate set of voltage limits, one being enabled during startup and the other being enabled

during shutdown (i.e. an upper voltage limit of 0.4 volts per cell and an a lower voltage limit of 0.0 volts per cell).

Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the switch of the Reiser et al. combination by incorporating the switches of the Applicants' specification because the Applications disclose known switches that would have voltage responsive hysterisis switches thereby improving the overall performance and reliability of the fuel cell system.

Claim 10 and 14: Rejection of claims 10 and 14 are as set forth above in claims 9 and 13

Claim 12:The rejection of claim 12 is as set forth above in claims 9 and 13.

5. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reiser et al. in view of Donohue et al. as applied to claim 15 above, and further in view of Reiser et al. (6,673,481).

Reiser et al. and Donohue et al. are as applied, argued, and disclosed above, and incorporated herein.

Claim 16: The Reiser et al. combination does not disclose that the element is a water accumulator in the fuel cell power plant.

Reiser et al. in Figure 4 discloses a water accumulator (164) in the fuel cell power plant (col. 5: 60-col. 6: 12).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell system of the Reiser et al. combination by incorporating the water accumulator of Reiser et al. because Reiser et al. teach a water

accumulator that would have provided a means for rapidly initiating the operation of a fuel cell at subfreezing temperatures thereby improving the overall performance and operation of the fuel stack.

6. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiser et al. in view of Donohue et al. as applied to claim 15 above, and further in view of Grasso et al. (6,451,466).

Reiser et al. and Donohue et al. are as applied, argued, and disclosed above, and incorporated herein.

Claim 18 and 19: The Reiser et al. combination does not disclose an enthalpy recovery device in the fuel cell power plant comprising graphite composite plates in the enthalpy recovery device.

Grasso et al. in Figures 1 and 2 disclose an enthalpy recovery device (95) in the fuel cell power plant comprising graphite composite plates in the enthalpy recovery device (col. 8: 7-42).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell system of the Reiser et al. combination by incorporating the enthalpy recovery device of Grasso et al. because Grasso et al. disclose a enthalpy recovery device that would have promoted the transfer of thermal energy and moisture between gaseous streams thereby improving the overall efficiency of the fuel cell stack.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H. Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas H Parsons
Examiner
Art Unit 1745

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER

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